

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

**RESIDUE MANAGEMENT, NO TILL AND STRIP TILL
(Acre)
CODE 329A**

DEFINITION

Managing the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops in narrow slots or tilled strips in previously untilled soil and residue.

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following:

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Maintain or increase soil organic matter content and improve soil tilth.
- Conserve soil moisture.
- Manage snow to increase plant available moisture or reduce plant damage from freezing or desiccation.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are grown.

This standard includes tillage and planting methods commonly referred to as no till, zero till, slot plant, row till, zone till, or strip till.

CRITERIA

General Criteria Applicable to All Purposes Named Above.

Loose residues to be retained on the field shall be uniformly distributed on the soil surface. Where combines or similar machines are used for harvesting, they shall be equipped with spreaders capable of distributing residue over at least 80 percent of the working width of the header.

Residues shall not be burned, or disturbed by full width tillage operations except as follows:

Planters or drills shall be equipped to plant directly through untilled residue or in a tilled seedbed prepared in a narrow strip along each row by planter attachments such as rotary tillers, sweeps, multiple coulters, or row cleaning devices.

If row cultivation or spot treatment for weed escapes, leveling ruts, or similar operations become necessary, tillage shall be limited to undercutting operations which minimize burial of surface residue.

Additional Criteria to Reduce Sheet and Rill Erosion.

The amount of residue needed to reduce erosion within the soil loss tolerance (T) or any other planned soil loss objective, shall be determined using current approved erosion prediction technology. Partial removal of residue by means such as baling or grazing, shall be limited to retain the

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amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Seedbed preparation, planting, and fertilizer placement shall disturb no more than one fourth of the row width. The row area formed by the planting operation shall be level with or slightly above the adjacent row middles unless the rows are planted on the contour.

Additional Criteria to Reduce Wind Erosion.

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T) or other planned soil loss objective shall be determined using current approved wind erosion prediction technology. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Maintain or Increase Soil Organic Matter Content and Improve Soil Tilth.

The amount of residue needed to achieve the desired soil condition shall be determined using the current approved soil conditioning index procedure. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Additional Criteria to Conserve Soil Moisture.

A minimum quantity of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface. Partial removal of residue by means such as baling

or grazing shall be limited to retain the amount needed.

Additional Criteria to Manage Snow to Increase Plant Available Moisture or Reduce Plant Damage From Freezing or Desiccation.

Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches in any case, stubble shall be maintained standing over winter to trap and retain snow. Loose residue may be removed providing that the remaining residue is left standing.

When crops are planted in the fall, the width of the tilled strip or slot shall be no more than one fourth of the row width, in order to reduce the disturbance of standing stubble.

Additional Criteria to Provide Food and Escape Cover for Wildlife.

Residue height, amount, and time period shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal would not adversely affect habitat values.

CONSIDERATIONS

No till or strip till may be practiced continuously throughout the crop sequence, or may be managed as part of a system which includes other tillage and planting methods such as mulch till. Selection of acceptable tillage methods for specific site conditions may be aided by an approved Soil Tillage Suitability Rating.

Consider the use of no till or strip till for the economic benefits, and to reduce the labor and time requirements of full width tillage.

Consider testing soil pH and available phosphorous and potassium for crops expected to be grown in rotation before starting a no-till system. Test the soil and

apply fertilizer for projected yields. Use starter fertilizer with no-till systems to boost seedling vigor. The testing procedure may need to be adjusted according to fertilizer application methods to give true representation of soil fertility. See Nutrient Management (590).

Production of adequate amounts of crop residues necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and row spacings.

Maintaining a continuous no till system will maximize the improvement of soil organic matter content. Also, when no till is practiced continuously, soil reconsolidation provides additional resistance to sheet and rill erosion.

Consider using crop varieties with increased seedling vigor and tolerance to cool soil conditions.

The effectiveness of stubble to trap snow or reduce plant damage from freezing or desiccation increases with stubble height. Variable height stubble patterns may be created to further increase snow storage.

Soil compaction may be reduced by controlled traffic, where wheel traffic from all operations is limited to the area between designated rows or traffic areas.

The value of residues for wildlife habitat can be enhanced by leaving rows of unharvested crop standing at intervals across the field.

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria, Considerations, and Operation and Maintenance described in this standard. Specifications shall be recorded

using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

Performance Criteria.

This practice will be considered applied when the crop residue levels have been successfully established according to the tillage system. All systems must provide at least 30 percent residue cover after planting. The line transect method will be used to determine percent ground cover present.

This practice will be carried out consistent with Iowa State University Extension Service Weed Control Guide for the current year (PM-601), pesticide label instructions and the laws and regulations of the state of Iowa.

The following types of conservation tillage systems and variation are acceptable:

No Till.

Seedbed preparation and planting is completed in one operation. Starter fertilizers and pesticides are usually applied during the planting operation. Soil disturbance is 10% or less. Contact herbicides are often used to burn down competing vegetation growing at planting time. An early application of a pre-emergence herbicide may lessen the need for the contact burn down application. Pre-emergence or post-emergence herbicides are used to control weeds during the growing season. Cultivation may be performed as needed.

Strip Till.

Seedbed preparation and planting are completed in one operation by a rotary tillage tool or other similar type equipment. Crop residue may be left undisturbed or chopped or shredded. Planting is

completed by tilling a seedbed which is no more than one third of the field area. Weed control is accomplished with a combination of mechanical cultivation and herbicides.

OPERATION AND MAINTENANCE

No operation and maintenance requirements have been identified for this practice.

REFERENCE:

Field Office Technical Guide, Section I-C-1
Erosion Prediction.

Nutrient Management Standard 590.

Pest Management Standard 595.

Iowa State University Extension Service
Weed Control Guide for the current year
(PM-601).